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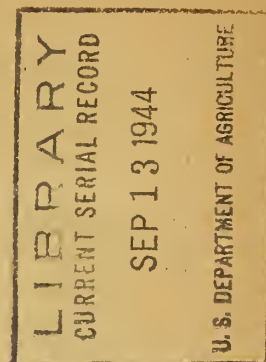


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UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Summary Review of Monthly Reports\*  
for  
SOIL CONSERVATION SERVICE RESEARCH\*\*

JULY 1944



EROSION CONTROL PRACTICES DIVISION

Conservation Experiment Stations Section

H. L. Borst of Zanesville, Ohio reports: "The cattle were weighed on July 3 and again on July 31. Up to July 3 they had been on pasture and had had no grain. Their average daily gain was approximately 1.85 pounds per day. From July 3 to 31 the animals were on second cutting alfalfa and were fed 78 pounds per head of corn and cob meal during the period. It is of interest that the daily gain during the past month with equally good pasture and corn was no greater than for last month when the herd was on pasture alone."

Dwight D. Smith of Columbia, Missouri reports: "Poor returns were secured from grazing of the bluegrass areas this spring. The contour furrowed bluegrass pasture produced 61 pounds beef per acre, the check area 26 pounds per acre, and the renovated area showed a slight loss in weight of the animals. The renovated area had by far the greatest growth of bluegrass, and was expected to give the greatest gain. There is the indication that these results may be due to an unbalanced fertility which produced an abundant growth of vegetation that did not have the capacity to produce animal gain. Nitrogen had not been added and legume seeding had failed."

E. C. Richardson of Auburn, Alabama reports: "In 1941 a steep area, terraced with bench terraces, was divided near the center at right angles to the terrace ridges. The area consisted of three terrace intervals. One end of the field was planted to Lespedeza sericea, while the other end was planted to kudzu. No hay or seed was harvested from either the sericea or the kudzu.

"In the spring of 1943 terrace interval No. 2 was plowed and planted to corn. That portion planted to sericea and followed by corn produced 38 bushels of corn per acre, while corn following kudzu produced only 20 bushels. In the spring of 1944, a good stand of volunteer sericea was obtained where corn followed sericea in 1943. It was destroyed by preparation of soil for corn

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\*\* All Research work of the Soil Conservation Service is in cooperation with the various State Experiment Stations.

in March 1944. In the area where corn followed kudzu in 1943, approximately 8,000 pounds of green kudzu was produced after the last cultivation of corn. This growth came from plants that escaped destruction in soil preparation and cultivation and from plants allowed to remain on the terrace ridges.

"In March 1944, terrace intervals 1, 2 and 3 were plowed for corn. This is the first crop of corn following kudzu, or sericea in intervals 1 and 3, and the second crop following kudzu or sericea in interval No. 2. As was the case in 1943 the first year corn following sericea appears slightly better than that following kudzu; however the difference is not as great in 1944 as in 1943 due to better development of kudzu. In terrace interval 2 where the second crop of corn is following sericea, the prospective yield is lower than that of 1943, while that following kudzu is higher."

E. C. Joy of Brookings, South Dakota reports: "The tillage and residue wheat plots at Brookings will be harvested about the first of August. The wheat all appears much alike except where grass had been used in the rotation for two years and then plowed out last fall. The wheat on these plots will undoubtedly yield several bushels more per acre than where no grass had been grown. The corn on these grass plots is likewise superior.

"On the wheat straw residue plots the best corn growth is where all wheat straw was returned or where manure was applied. Tillage appears to make little difference.

"On other soils plots here at the station where the rotation is two years small grain and one year row crop sub-surface tillage has given more weed trouble and poorer crop response than where the land was plowed."

C. J. Whitfield of Amarillo, Texas reports: "Stubble mulch and wheat production--Harvesting of wheat on the station was completed on July 12. All but about 12 acres was harvested before rain fell on the ripened grain which means that most of the grain was obtained in excellent condition. Most of the wheat tested between 60 and 63 pounds per bushel. The highest yield of wheat seeded on fallow was 40.9 bushels per acre and all wheat on fallow averaged 36.86 bushels per acre. The average yield of wheat seeded following wheat was 26.70 bushels per acre and the average yield for the entire station including all fields, plots and alleys seeded to wheat for protection was 28.73 bushels per acre. Winter barley harvested on the station made a yield of 42.28 bushels per acre.

"These yields which are considered very good were made in the face of very poor prospects at seeding time. According to a formula recently developed for computing prospective wheat yields at seeding time, prospects for wheat seeded on fallow at the station last fall had a two to one chance of producing 12 bushels per acre plus or minus three bushels, and wheat seeded after wheat should have been a failure. The chief reason for the wide variation between the computed and actual yields was the unusually favorable amount and distribution of winter and spring precipitation.



"Grain and straw yields from the stubble mulch plots were as follows:

"Tillage Implement Study

Treatment	Grain	Straw
	Bushels per acre	Bushels per acre
Wheat on stubble fallow.....	35.9	3,142
Wheat on delayed fallow.....	38.3	3,237
Wheat on clean fallow.....	35.8	3,126
Wheat after wheat - oneway plow.....	30.9	2,692
Wheat after wheat - moldboard plow..	25.0	3,521
Wheat after wheat - lister.....	30.0	2,517
Wheat after wheat - Noble blade.....	32.6	2,716
Wheat after wheat - 30-inch sweeps..	34.2	2,441

"Rate of Stubble and Degree of Covering Study

Method of tillage	0 lb. stubble		1500 lb. stubble		3000 lb. stubble		Average	
	Grain (bu.)	Straw (lb.)	Grain (bu.)	Straw (lb.)	Grain (bu.)	Straw (lb.)	Grain (bu.)	Straw (lb.)
30-inch sweeps....	31.6	1,711	36.0	3,037	35.3	1,870	34.3	2,206
Oneway plow.....	23.2	2,416	29.9	2,399	34.5	2,279	29.2	2,364
Moldboard plow....	23.8	3,770	24.9	2,359	25.5	2,861	24.7	2,996
Average.....	26.2	2,632	30.3	2,598	31.8	2,337		

"In the tillage implement study, the stubble fallow and delayed fallow are both tilled with the 30-inch sweeps. The difference in the two treatments is that on the stubble fallow, tillage begins immediately after harvest while on the delayed fallow, tillage is delayed until the following spring. The clean fallow is tilled with the oneway plow. One reason for the delayed fallow making a better yield than stubble fallow the past season is the large amount of snow received during the winter which was held better by the undisturbed stubble. Moisture was so limited last fall that weed growth was a negligible factor. In the continuous plots the two stubble mulch treatments, namely Noble blading and sweeping, produced the highest yield as it has in the past. These plots also had excellent protection from erosion.

"In the rate-of-stubble study, the 30-inch sweeps again produced the highest yield followed by oneway plowing and moldboard plowing. The heavier rates of stubble also produced higher yields. These results indicate that even with favorable precipitation the heavier the stubble, up to 3,000 pounds per acre; the greater the yield, and the more residue remaining on the surface, the greater will be the yield.

"The Dalhart Sand Dune Area was visited during the month. This area, stabilized and reseeded to grass from 1937 to 1941, is attracting a large amount of attention at this time as it has been grazed during the spring and summer. Stacking rates have been in line with good management practices and no soil damage has occurred. Also, an excellent cover is being maintained. The wide selection of early spring and summer grasses has produced one of the fattest groups of steers on grass alone ever seen on the Plains. In early spring, western wheatgrass and Canada wild-rye were well utilized and as the season advances, blue grama, buffalo grass, weeping lovegrass, sand lovegrass, sand dropseed, sand bluestem and little bluestem are furnishing the bulk of the forage with blue grama being utilized somewhat heavier than the other major species. Sand lovegrass has been grazed fairly heavily though it covers only a small acreage."

Oren R. Neal of New Brunswick, New Jersey reports: "Yields of small grains and alfalfa hay from eroded and uneroded areas in 9 different fields were measured. The average yield of each crop from the two soil conditions is shown in the following table:

"Crop yields from eroded and uneroded areas

Crop	Eroded	Uneroded
Wheat.....	14.3 bu./acre	32.1 bu./acre
Oats.....	20.6 bu./acre	32.4 bu./acre
Barley.....	25.4 bu./acre	52.2 bu./acre
Rye.....	13.9 bu./acre	30.9 bu./acre
Alfalfa.....	1.07 tons/acre	1.92 tons/acre

"The wheat and rye crops were grown following potatoes in 1943. No fertilizer was applied to the small grain in these cases. It is interesting that the differences in yield of small grain from eroded and uneroded areas are relatively greater than the average differences in potato yield from similar soil conditions. The residual effect of fertilizer appears to be greater on the uneroded areas."

John Lamb, Jr. of Ithaca, New York reports: "Corn shows up well on subsurface plowing at Marcellus. The method of seedbed preparation experiment with corn shows promise of producing some interesting results. Discing, subsurface plowing, and conventional turn plowing are being compared using two levels of fertilization; namely, 1,000 pounds per acre of 10-10-10 with 300 pounds applied with the planter and the remainder disced in or applied in bands at the bottom of the furrow when plowing. The low rate is 300 pounds per acre of 5-10-5 all applied with the planter. The disced plots are decidedly the poorest in stand, growth, and weediness. The subsurface plowed low rate plots are only slightly better in growth than discing but the high rate is decidedly better than even conventional plowing. The plots which were prepared by conventional plowing show no difference with respect to rates of fertilization."

J. W. Slosser of Presque Isle, Maine reports: "An intensive study of cultivation efficiency was conducted on the row placement study set up on the terraced field. To facilitate the work a country mechanism was constructed on the cultivator, so arranged that it operated only when cultivator was working. This enables the operator to check land areas actually in potatoes with high degree of accuracy.

"The following table shows some of the relationships developed:

Field	Area in acres	Time to cult., minutes	Rate a/hr	Pct. of total area	Total pct. of time to cult.
C1*	1.94	75	1.55	73	71
C1	.70	30	1.40	27	28
C2*	.946	30	1.89	78	60
C2	.27	20	.81	22	40
C3*	1.26	60	1.26	76	75
C3	.39	20	1.17	24	25
C4*	1.75	65	1.62	89	84
C4	.21	12	1.05	11	16
C5*	.41	20	1.23	71	77
C5	.17	6	1.70	29	23
Total of long rows L*	6.31	4.16 hr.	1.52	78	74
Short or point rows S	1.74	1.47 hr.	1.18	22	26
Totals	8.05	5.63 hr.	1.43		

\* Rows running parallel to terraces full length of field (635 ft.). Remaining rows are short or point rows. Cultivation efficiency test was conducted on rows of various length. All tests were run at 2.25 M.P.H. with a 2-row tractor cultivator. Time includes turning time at row ends."

George W. Hood of Batesville, Arkansas reports: "Our oat crop was thrashed during the month. Some outstanding facts are evident. This is the first year in 4 that the oat crop has not been a failure. Three facts, I believe, contribute to the success this year: 1 - seedbed preparation; 2 - variety; 3 - method of seeding. The seed bed was plowed and disked. The grain was planted with a seed drill at the rate of 2-1/2 bushels per acre. The DeSoto, a new variety of winter oat, was selected.



The DeSoto oat is one that has been developed by the State Agriculture Experiment Station and was first introduced and distributed two years ago. This oat is very hardy, surviving a temperature as low as 12 degrees below zero without damage. The stalk is short, stiff and disease free and gives evidence of being one of the best winter oats yet developed.

"The yield on our plots ranged from 42 to 47 bushels. This is a good yield, when you consider that 5 years ago the soil on which the oats were grown was abandoned and would grow nothing. On better land at the station, this oat has produced about 65 bushels per acre."

H. O. Hill of Temple, Texas reports: "Hubam seed have been successfully harvested at the Blackland Station by combining from a dried windrow. A swather or windrowing device consisting of a series of iron rods was attached to the brace bar of a mowing machine. These rods drawn along on the ground behind the sickle have the ends turned up in a circular pattern, are spaced at four and one-half inch intervals on the brace bar, and increase uniformly in length from the outside one that is four feet long to the inside one which is 12 feet long. In this form, short Hubam, 3 feet tall or less, was windrowed very satisfactorily. On taller growths the addition of a device for separating the clover at the end of the sickle was necessary to prevent the cut clover from remaining entangled with the uncut. This divider was made of light angle iron in the form of a 45° right triangle with 6 ft. sides. The triangle was bolted to the outer end of the brace bar at the 90° angle so that the hypotenuse was at an angle of 45° with the ground. This side of the divider separated the Hubam growth ahead of the sickle and a good windrow is made of the tallest growths with some assistance from a man on the machine."

"The most satisfactory job of windrowing is done at a fast speed. High wind will prevent the clover from falling down correctly and make windrowing difficult. Windstorms may pile the windrows together after they are made."

"A combine will pick up and thresh the Hubam from the dried windrow without the aid of a pickup attachment. Five to seven days drying in the windrow is sufficient before combining. Threshing on a hot dry day will hull 90 to 95% of the clover seed. This method approximately doubles the yield of Hubam seed harvested under field conditions."

F. L. Duley of Lincoln, Nebraska reports: "Corn is making good growth on plots where the best treatments have been followed. Corn the first year after second year sweet clover is the best at this time. However, where the second crop of corn following sweet clover is growing, the prospects are much poorer. It looks like the first crop last year may have drawn so heavily on the soil that only a small crop is possible this year."

"In our cooperative work with the Department of Entomology, we are finding that continuous corn on one of our fields shows much damage from northern corn root worm. In the same field corn following wheat shows very little infestation. There is no indication so far that we have had any infestation of the southern corn root worm this year. There appears to be little difference in the spring plowed and subtilled land, but some indication that fall plowing has suffered less, and last year fall subillage showed a lighter infestation than where the land was not worked until spring."



Hugh C. McKay of Aberdeen, Idaho reports: "The soil loss from erosion this year was quite light on all of the stubble mulch tillage plots. There was only a small amount of snow with a low water content, consequently there was but very little runoff. The following table gives the soil loss in tons per acre:

"Average soil loss in tons per acre from crop residue utilization tillage plots

Initial tillage implement	Stubble burned	Stubble utilized				
	Weed when necessary	Weed immediately	Weed when necessary	*Spring disk	*Fall disk	Average
Moldboard.....	1	1	1	4	5	2.4
Oneway disk.....	5	1	0	2	2	2.0
Moldboardless.....	1	3	0	3	1	1.6
Rod weeder with shovel attachment.	0	0	0	1	0	0.2
Fall plow, moldboardless.....	3	1	0	1	1	1.2
Average.....	2	1.2	0.2	2.2	1.8	

\*Preparatory tillage before initial tillage.

"Only a small amount of residue, about 1,500 to 1,800 pounds per acre, was present on these plots. As shown in the above table, the highest average soil loss occurred in the moldboard plowing with 2.4 tons per acre. The least soil loss occurred in the plots tilled with the rod weeder with shovel attachments with an average loss of only 0.2 tons per acre. Only the plots that were spring disked before plowing showed any soil loss for the rod weeder with shovel attachments."

Orville E. Hays of LaCrosse, Wisconsin reports: "By use of our rain classification factor these data would produce a factor of 14 which would place the storms in the high rainfall factor group. However, storms have been experienced since the station has been under measurement with factors above 20.

"Losses from watersheds

Treatment	Runoff in inches	Soil loss Tons/Acre
Contoured corn - six year rotation.....	0.81	51.95
Strip cropped - six year rotation - corn on strip immediately above measuring unit.....	0.45	21.77
Terraced - corn - six year rotation.....	0.76	9.81
Pasture - moderately grazed.....	0.09	

"Soil losses from contoured corn are excessively high during intense storms due to the fact that intensity so greatly exceeds infiltration plus surface storage. The losses from terraced land is low because of the short length of slope and due to the fact that part of the soil is deposited in the channel. Soil losses were high from the strip cropped watershed due to the fact that corn was immediately above the measuring equipment when the intense storm was experienced. This point is further emphasized by the following data from the Hundt farm strip cropping experiment.

"Contoured only

Treatment	Length of slope	Runoff in inches	Soil loss tons/acre
Contoured corn.....	250 ft.	0.52	10.7
Contoured grain.....	250 ft.	0.68	2.0
Contoured hay.....	250 ft.	0	0

"Contour strip cropping

Crop and width of strip						Runoff in inches	Soil loss tons/acre		
Top			Bottom						
Hay	50'	Grain	50'	Hay	50'	Corn	50'	.24	2.63
Hay	50'	Grain	50'	Hay	50'	Corn	100'	.19	4.11
Hay	50'	Grain	50'	Hay	50'	Corn	50'	.46	2.48
Hay	50'	Grain	50'	Hay	50'	Corn	50'	.15	.50
				Hay	50'				

"The strip cropped watershed lost 42% as much soil with corn on the bottom strip as the contoured watershed with the entire length planted to corn. On the Hundt farm experiment the strip cropped plots with 100 foot width of corn on the bottom strip lost 38 per cent as much soil as the same lengths of slope with the entire length to contoured corn.

"During intense storms long slopes that are controlled by strip cropping only are losing excessive amounts of soil where the lower strips are in corn or grain. After the June 22 storm data on rilling were obtained in the Coon Valley watershed in cooperation with Operations personnel. Fields were selected in which there were alternate strips of corn and hay. Measurements were made on number and cross sectional area of rills in a 150 foot section of contour corn. Measurements were made on five farms. It was found that the first and second strips from the ridge had an average of 170 square inches of rill area, the third and fourth an average of 258 and the fifth and sixth an average of 552 square inches of rill area. These data would indicate the need for terraces or division terraces on long strip cropped fields to reduce the lengths of slope probably to 250 to 300 feet."

John T. Bregger of Clemson, South Carolina reports: "Results of the "compaction experiment" continue to grow more interesting, especially in view of a recent article in the PACIFIC RURAL PRESS in which Dr.

"Effect of dust mulch on soil moisture conservation

Treatment	Depth	Percent available moisture*						
		July 10	July 12	July 14	July 18	July 22	July 25	July 27
Dust mulch (Shallow tillage)	6"	95	95	95	95	85	65	50
	12"	100	95	95	95	94	90	90
	18"	100	95	95	95	95	95	95
No dust Mulch (No tillage)	6"	90	60	50	45	30	10	5
	12"	65	60	60	60	50	35	30
	18"	75	75	75	75	70	65	50

\*Approximate conversions from gypsum block readings. Note: No rainfall penetration to 6" depth during period covered by table."

Richard M. Smith of Morgantown, West Virginia reports: "It might be of general interest to note that birdsfoot trefoil plants are known to be established on about 25 different areas throughout West Virginia in our various pasture, meadow, and eroded soil trials. At most locations the plants are scattered, and the contribution to yields is small. Even so, this legume seems to deserve some further attention in the state, particularly on the poorer hill land pastures, on contour furrows and diversion ditches, on strip mine spoil banks, and on some severely eroded soils. It grows slowly and seems to be intolerant of shade, but it apparently is drought resistant, winter hardy, tolerant of rather low fertility, and capable of persisting and spreading under normal grazing conditions in West Virginia. We don't believe that birdsfoot trefoil should be widely recommended in the State as yet, but over a long period of time it may prove to be of considerable value under certain conditions.

"Nitrogen determinations on herbage from some of the pasture trials in 1943 indicate a marked increase in protein due to reseeding in all cases. An average for the season from seven trials shows:

	Percent protein	Yield of protein in pounds/acre
No treatment	8.7	94.4
Surface treatment	9.5	114.4
Plowing, treatment and seeding	13.5	179.6
Shallow tillage, treatment and seeding	13.2	292.5

Carl L. Englehorn of Fargo, North Dakota reports: "During the 1943 season, the Edgeley tillage plots in continuous wheat for four years had become infested with weeds. Especially were the stubble mulch plots infested with horseweed (Erigeron canadensis) and pigeon grass (Setaria viridis) to the extent that yield of wheat was low. Plots tilled with the moldboard plow were comparatively weed free. It was expected that this



same situation would prevail during the 1944 season. However, with the exception of the non-tilled burned plots, little weed growth has occurred on the plots this season.

"At Langdon, on the other hand, the continuous wheat plots were highly infested with weed growth this year. Particularly are they infested with wild oats; smaller areas of Canadian thistle and perennial sow thistle also occur. Although tabulation of weed counts are not complete, it appears that weed distribution has not been affected by tillage method; wild oats and Canada thistle appear in other portions of the farm which have not been in fallow during the past several years."

Alvin E. Lowe of Garden City, Kansas reports;

"Summary of grain yields of winter wheat produced on various cultural treatments of fallow on Basin Project, Garden City, Kansas, Experiment Station

Cultural treatment	Bushels grain per acre					
	1941	1942	1943	1944	4 yr. avg.	2 yr. avg.
44-inch basin list on contours.....	30.6	18.9	18.4	28.5	24.1	23.4
44-inch ordinary list on contour....	31.8	17.9	17.4	26.7	23.4	22.0
44-inch basin list up and down slope	30.0	19.3	10.5b	21.8	20.4	16.2
44-inch ordinary list up and down slope.....	27.4	12.4	10.2b	25.7	18.9	18.0
20-inch basin on contour.....	31.8	15.2	19.2	20.5	21.7	19.8
20-inch basin up and down slope....	27.2	15.8	17.1	19.2	19.8	18.2
Oneway on contour.....	30.9	15.2	17.6	25.0	22.2	21.3
Oneway, basined on contour.....	25.3	17.3	16.5	26.0	21.3	21.2
Good farm practice (basined on contour).....	29.8	14.3	16.2	26.1	21.6	21.2
Trashy fallow (straight blade or sweeps).....	21.8a	11.1a	6.2b	24.0	15.8a	15.1

a - Not comparable to other methods, as short fallow period both years in getting method started.

b - Badly infested with Russian Thistle."

DRAINAGE AND WATER CONTROL DIVISION

Hydrologic - Land Use Studies

North Appalachian Experimental Watershed at Coshocton, Ohio -

"L. L. Harrold reports: "Of 2.49" of rain that fell this month, a 1.15" storm of July 19, was the only one that caused significant runoff. Similar to the June 22 and 23 storms reported last month, the plowed watersheds had more runoff than the disked watershed. Runoff for watershed 106 (plowed, straight rows) totaled 0.27", that for watershed 121 (corn, plowed on contour) was 0.16, and there was no runoff from disked residue watershed 188. Soil moisture observations made before and after this storm, given below, show that there was noticeably more moisture in the disked watershed than in the plowed watershed.

"Soil moisture data - corn watersheds

Date	Soil depth	Watershed No.-		
		106	121	188
	Inches	Percent	Percent	Percent
7-6-44	0-7	11.8	10.8	14.1
	7-14	12.9	12.0	18.3
7-25-44	0-7	9.4	8.7	12.1
	7-14	9.2	9.7	14.0

"As the extremely dry weather continues, soil moisture may be an important factor in corn yield this year. The corn on the disked watershed appears good and has not yet shown any nitrogen deficiency.

The board of supervisors of the Coshocton County Soil Conservation District visited the project and inspected the corn and meadow watersheds under various farming practices and inspected several field trial trash mulch alfalfa seedings at the station and on cooperating farms."

Central Great Plains Experimental Watershed at Hastings, Nebr. -

I. W. Bauer reports: "Rainfall for the month of July at the Meteorological Station, was 7.93". There was no runoff during the month. The rain fell in small showers, largest being .38", so most of it was lost by evaporation.

"The small grain was harvested this month. Yields were very poor; oats yielded from two to ten bushels per acre; barley from 0 to 4 bushels per acre. We had no wheat on the plots, but the yield of wheat in this community was very low. Much of the wheat was plowed under without being harvested. The corn is in good condition, but will require some rain next month to keep it from burning.

"Some brome grass was harvested in cooperation with the State Highway Department. The seed will be used in the channel at Station No. 5."



Hydrologic Studies - LaFayette, Indiana - R. B. Hickok reports: "Heavily fertilized corn plots with surface mulch of meadow residue (subtilled) showed little difference in development from similar plowed, clean tilled plots. However, another set of plots which received only the usual amount of fertilization and similar treatment showed definitely better growth on the plowed plots, indicating that mulching may affect the crop through nutrients derived from the residual material so that nutrients may become limiting before moisture where other sources of plant food elements are low. These observations indicate that the use of surface mulches may be most critical and possibly least satisfactory on low fertility lands and may require the use of more commercial fertilizers than the conventional plowing under of the residues, at least for the beginning of the practice. It is notable that nitrogen hunger symptoms with low fertilization of mulched corn, which have appeared in the early growth stages and apparently were fully overcome by the time of tasseling other years, were not so manifest until later and appeared to be serious at the tasseling time this year. This may have been due to retarded break-down of the surface mulch with relative low rainfall. These are merely indications which may or may not be confirmed by conclusive experimentation.

"The following are yields from conservation and prevailing-practice-treated experimental watersheds in wheat and meadow on the Throckmorton Farm this season as indicated by the averages of samples from each watershed:

Watershed	Practice	Crop	Per Acre Yield
5	Prevailing	Wheat	27.07 bu.
8	"	"	24.51 "
6	Conservation	"	30.39 "
7	"	"	28.66 "
10	Prevailing	Meadow	1,869 lbs.
13	"	"	1,762 "
15	"	"	2,366 "
14	Conservation	"	3,268 "
18	"	"	3,770 "

"Wheat on the prevailing-practice-treated watersheds received 150 lbs./A of 0-14-7 with drilling and was in straight drill rows. Wheat on conservation-treatment watersheds received 400 lbs./A of 0-14-7 with drilling, approximately 4 tons of manure/A and 200 lbs./A of 10-6-4 top dressing in the winter and spring, respectively, and was contour drilled.

"Prevailing-practice meadows were timothy and red clover; while conservation-treatment meadows also included alfalfa and alsike in the seeding mixture. No fertilizer was applied in either case, but preceding wheat on these watersheds was fertilized similarly to those for 1944. The conservation-treatment watersheds also received heavy application of fertilizer and manure plowed down for corn in 1942."



Hydrologic Studies - East Lansing, Michigan - W. U. Garstka reports: "The drought which set in late in June continued practically unabated throughout the month of July 1944. The last measurable precipitation in June occurred on the 23rd. Total rainfall for July as measured in the standard gage at the cultivated watershed amounted to .86", .78" at the stubble mulch plot and .93" at the wooded watershed. The average precipitation for East Lansing, as established by the 48-year record at the U. S. Weather Bureau, is 2.67". No runoff occurred during the month.

"Cecil Rhodes discussed with W. U. Garstka some of the problems associated with the use of gypsum blocks in concrete. It was discovered that some of the blocks placed in proximity to fresh concrete showed a depression of the resistance down to as low as 10 ohms. The invasion of electrolyte concentrations exceeding the buffer capacity of calcium sulphate was suspected. It was suggested to Mr. Rhodes that he make an experimental casting of a slab of concrete over some new gypsum blocks to see how rapidly and to what extent depression of resistance occurred with the penetration of water from the cement mix.

"On July 24 W. U. Garstka participated in an inspection tour of the Wisconsin Valley Improvement Company's hydrologic activities and reservoirs in the upper reaches of the Wisconsin River Valley. The following men made this inspection trip: R. S. Brown representing the Soil Conservation Service's Wisconsin state office and also the Regional office; F. C. Christopherson representing the U. S. Geological Survey, N. E. Minshall, SCS Office of Research, Madison, Wisconsin; W. E. Hiatt, Regional Engineer of the U. S. Weather Bureau from Chicago; A. T. Lenz representing the Wisconsin Agricultural and Engineering Experiment Stations; H. Lyon representing the U. S. Engineers office, St. Paul, Minnesota; M. W. Kyler, General Manager of the Wisconsin Valley Improvement Company; and W. U. Garstka.

"July 25 was spent in attendance at meetings making detailed arrangements for the participation of the various agencies in the integrated hydrologic program for the Wisconsin River Valley.

"On July 26, W. U. Garstka journeyed with M. W. Kyler to the Service's hydrologic instrument installations at Rainbow Reservoir near Lake Tomahawk, Wisconsin. Instruments were checked and adjusted and operators were instructed in some of the maintenance procedures.

"Detailed plans were made with M. W. Kyler for the installation of snow survey courses and instrumentation of a number of snow locations in preparation for the coming winter. Some work was done in the office during the month on the averaging of clusters of points on paper in preparation for the drawing of gypsum block resistance-percent moisture curves for the cultivated watersheds."

Microbiological Studies - Lincoln, Nebraska - F. L. Duley reports: "In our microbiology work, attention is being given to certain plots that show retardation in growth in an effort to explain the cause of yellowing or reduction in growth of corn early in the season. Temperature readings are being made on bare plots and plots with different amounts of straw. The results show much greater fluctuation in temperature on the bare plots.

"Nitrogenous fertilizers applied to wheat in the spring showed no significant effect on the yields of wheat. Work is being continued on the effect of organic matter and microbiological decomposition products on the stability of soil structure."

### Runoff Studies

Region II - Danville and Blacksburg, Va. - George A. Crabb, Jr. reports: "Rainfall for the month of July at Chatham, Va., amounted to 4.95". This caused significant runoff peaks on watershed W-I of .036, .089, .089, .043, and .030 cfs, (unconnected) on watershed W-II of 9.91 cfs (unconnected) and on watershed W-III of 3.42, 1.73, and 1.91, and 2.31 cfs (unconnected). It was interesting to note that rain patterns varied quite a bit between the three watersheds in question.

"Rainfall for the same month at Blacksburg amounted to 4.85" and produced no significant runoffs on watershed W-II. Significant runoff peaks of .005, .007 and .002 cfs (unconnected) were found on watershed W-III.

"Data from the runoff control plots have been presented in popular form, by project personnel, in the MSS for a pamphlet to be entitled "Losing Farms by the Truckload." This presentation has been approved by State and Federal authorities, and it will be released by the Virginia State Soil Conservation Committee about the middle of August.

Region IV - Muskogee, Oklahoma; Bentonville, Ark., and Vega and Garland, Tex. - V. D. Young reports: "The month has been spent in compiling runoff records from the Bentonville watersheds and completing the typing of rainfall records. Four storms were selected which produced maximum rates of runoff for the year 1943, and these are being compiled with pondage correction. The balance are being checked and compiled without the pondage correction. Hydrographs are being plotted for a number of storms which caused runoff from the watersheds since they were installed."

Region VI - Colorado Springs, Colo. - H. K. Rouse reports: "No report was prepared at the end of June as I was on detail in Washington, consequently, this report covers both June and July.

"Drought conditions prevailed throughout June with precipitation of but 0.27" as compared with a normal of 1.72". In July, precipitation totaled 3.32" as compared with a normal of 2.42". For the seven months of 1944, precipitation has been 11 percent in excess of normal.

"No runoff occurred in June. In July, however, five runoff periods were recorded on each of Watersheds W-I and W-IV, three on W-II and one on W-III. The storm of July 15 produced the maximum observed rates of runoff thus far recorded in seven years of record on Watersheds W-I and W-II, amounting to 29.7 cfs on W-I and 7.62 cfs on W-II. These rates are before application of pondage correction.



"I spent the period June 9 to July 27 in Washington with Mr. D. B. Kringold, in the preparation of data and copy for a publication incorporating rates and amounts of runoff and related information for the hydrologic design of conservation practices and structures in the Western High Plains. This is based, principally, on data obtained at Runoff Studies projects at Colorado Springs, Colorado, and Vega, Texas, and at the Fort Hays Conservation Experiment Station, Hays, Kansas."

### Hydraulic Studies

Hydraulic Studies at the St. Anthony Falls Hydraulic Laboratory, Minneapolis, Minn. - F. W. Blaisdell reports: "The McCredie, Missouri drop inlet culvert model was nearly complete at the end of the month. Material for the test basin was received on July 10, and the assembly of the basin was completed on the 13th. All necessary piping to conduct water to the model has been installed. The crest of the inlet was poured on July 29, and final shaping is now in progress. A false floor to simulate the dam face is also under construction."

"Analysis of the data on pipe bleeders was resumed after a lapse of 18 months due to the pressure of other work. This analysis has developed a promising lead, but additional studies will be required to prove or disprove the validity of the present method of approach."

Hydraulic Studies at Logan, Utah - C. W. Lauritzen reports: "Measurements of permeability, erosivity, and shrinkage were continued. The permeability of soils and soil bentonite mixtures seem to be chiefly dependent upon a combination of two factors - density and the swelling properties of the material. Compaction at optimum moisture reduced the permeability of a sandy loam: Sand (1.0 - 0.05) 78.25 percent, silt (0.05 - 0.002) 14.5 percent, clay (0.002 - 0.000) 7.25 percent, to a coefficient as low as 3 ft. per year. The addition of a bentonite, which swells approximately 10 times upon wetting, at the rate of 2 percent further reduced the coefficient to less than 0.1 ft. per yr. and 5 percent bentonite to less than 0.1 ft. per yr. without compaction. When bentonite which swells to approximately twice its volume upon wetting was used, 5 percent was required to reduce the coefficient to less than 0.1 ft. per yr. with compaction at optimum moisture and 10 percent when compacted in an air dry condition."

Hydraulic Studies at McCredie, Missouri - B-2 - D. D. Smith reports: "Calculation of retardance for the 3-year-old timothy-redtop channel tested during May was completed. For a hydraulic radius of 0.35 retardance as expressed by Manning's  $n$  was equal to .097, at a hydraulic radius of 0.5 it was .047, and at a hydraulic radius of 0.7 it was .034. All values were higher than for the 1-year-old grass, and about the same as for the 2-year-old grass."

"Mr. Zingg has completed his analysis of the effect of stock ponds on the runoff hydrograph for the drainage area of the ponds and has projected the results to the hydrograph for a one square mile area on the basis of 3 normal sized ponds per quarter section of land (approximately the size



of the average farm). These results show only a 3 percent crest reduction for a 500 c.s.m. discharge rate for the pond with a side spillway, but a reduction of 14 to 15 percent for a discharge rate of 500 to 2,000 c.s.m., when the ponds have the detention feature with a 2-inch diameter flood storage drain."

Hydraulic Studies at Ontario, Oregon - A. W. Marsh reports: "Harvesting of the barley on the regular plots on the hillside plots was completed. The barley plots yielded as shown in the following table:

Treatment	Plot No.	Bu./acre	Ave.
Green manure	1	77.2	
plus manure	9	72.1	74.7
20 T manure	2	55.8	
plus 4000# S	6	74.2	65.0
4000# Gypsum	4	64.6	
	7	58.4	61.5
6000# Sulfur	5	55.0	
	8	41.7	48.4
Border	3	55.0	
irrigation	15	61.3	58.2
6 hour "	13	50.0	
	18	55.0	52.5
12 hour "	14	65.5	
	19	61.7	63.6
24 hour "	16	54.6	
	20	73.8	64.2
48 hour "	17	48.3	
	21	70.0	59.2

Hydraulic Studies at Prosser, Washington - Stephen J. Mech reports: "All corn plots were cultivated and ditched but not hilled the last week in June. On July 7-9 they were irrigated then thinned by hand to assure a more uniform spacing. On July 14 all plots were cultivated, hilled, and ditched. This is the second and last cultivation of the season. All plots were again irrigated July 27-29 and complete set of data was again obtained.

"The remaining 32 gravimetric soil moisture measuring units were installed in the corn to measure the moisture at depths ranging from 1 to 4 feet.

"Partial analysis of the data on hand indicates that the use of the smallest head adds less water to the soil than does an application head two times as large as that necessary to produce a uniform trickle of runoff. It seems also that the plot receiving the lowest rate of application is showing earlier symptoms of drought."

Hydraulic Studies at the California Institute of Technology, Pasadena, Calif. - Vito A. Vanoni reports: "Recommendations for the repair of Thille Dam in the Los Posas in Ventura County were formulated and discussed with the District Engineer. The recommended modification of the structure included installing a rectangular drop of about 16 feet with an apron 32 feet long. Wing walls were recommended which extend diagonally at 45° from the end of the basin between the gully banks. The top of the wing wall is placed at the elevation of the gully bottom. On July 12 the model was demonstrated to a group which included two of the farm-owners, who are financing the repair of the dam, and several representatives of the SCS."

"Further tests were made in connection with the development of a pipe flow meter for use on the so-called alfalfa valve. The first meter developed was arranged so that the valve had to be removed in order to install the meter and therefore the meter could be used only with all of the flow discharging through the one gate. The modified meter is arranged so that the valve can be kept in place while the meter is in operation. In this manner flows at any valve opening can be metered. Several modifications of a design of this kind were calibrated and from these results an acceptable design was selected."

#### Sedimentation Studies

C. B. Brown reports: "At the request of the City of Radford, Va., a reconnaissance sedimentation survey was made of the Radford Municipal Reservoir on Little River. This is a narrow channel-type reservoir completed for hydroelectric power development in August 1934. Its original capacity of 1646 acre-feet has been reduced 38.2 percent in 10 years. The high rate of silting has resulted primarily from the low ratio of capacity to drainage area. The watershed contains 329 square miles of roughly rolling to mountainous terrain of which about 80 percent is forest and pasture. Erosion has been locally severe, however, and most of the sediment appears to come from steep areas of cultivation, poorly managed pastures, and roads. A conservation survey of the drainage area is underway."

"An article by L. C. Gottschalk on 'Sedimentation in a Great Harbor,' published in the July issue of 'Soil Conservation,' has attracted wide attention in Maryland, and especially in Baltimore to which the article refers. The article is being reprinted in the 'Maryland Farmer' and in the monthly magazine of the Baltimore Association of Commerce. A more comprehensive article by Mr. Gottschalk entitled 'Effects of Soil Erosion on Navigation in the Upper Chesapeake Bay Region' has been approved for publication in a technical journal."

"An inspection of the upper end of Loch Raven Reservoir was made in company with engineers of the Baltimore water department to discuss plans for trial plantings of vegetation designed to create a sediment screen to prevent movement of silt farther down into the reservoir. These plantings will be made as a result of suggestions contained in a report on the sedimentation survey of this reservoir made last fall.

"At the request of the U. S. Engineer Office, Huntington, W. Va., data were supplied on SCS sedimentation surveys of Muskingum Watershed Conservancy District Reservoirs. The Engineer Office has requested cooperation in their plans to make early resurveys of Senacaville, Piedmont, Tappan and Pleasant Hill Reservoirs and an original survey of Charles Mill Reservoir..

"An article by Clifford Adams, entitled 'Mine Waste as a Source of Galena River Bed Sediment' was published in the July issue of 'Journal of Geology.' Mr. Adams now at the University of Iowa made studies of sedimentation in the Galena River, with particular reference to its effect on flooding, as a collaborator of the Sedimentation Section in 1939 and 1940. The studies were subsequently extended by Mr. Adams as a thesis problem. The abstract of this article states:

'Accelerated soil erosion, resulting from agriculture, has increased the rates of sedimentation in many streams and valleys in various parts of the United States. In the Galena River Valley, in southwestern Wisconsin and northwestern Illinois, the effect of soil erosion is complicated by sediment produced by mine wastes and tailings of the lead-and zinc-mining industry. A previous survey did not find an appreciably greater total volume of modern sediment (deposited since commercial mining and intensified soil erosion began) than in nearby valleys affected only by the influence of soil erosion. The present studies, by contrast, show that comparisons of the carbonate content and texture of the mine wastes and stream-bed materials indicate that mining wastes do furnish a major part of the stream-bed sediment. This difference is probably due in part to the comparative coarseness of the mine wastes, which are mostly of sand size or larger and hence are not spread over the valley flood plain as freely as the silts and clays, which are derived chiefly from soil erosion. Rough comparisons indicate that the mine-waste materials formed something like two-thirds of the stream-bed deposits in the lower two-thirds of the Galena River in the summer of 1941.'

Sediment Studies at the California Institute of Technology, California - Vito A. Vanoni reports: "Studies of the sediment problem of Escondido Creek were continued, based on information obtained from a field trip during the past month. The preliminary report with tentative recommendations for correction of the difficulty was prepared.



"A report by H. A. Einstein entitled, "Bed-load Transportation in Mountain Creek" was sent to Pasadena to be completed before it is reproduced. The completion involved preparing the balance of the stencils and in proof-reading. The results of this study are very important in connection with studies of sedimentation in streams such as the Escondido Creek.

"Considerable time was devoted to calculating and tabulating the data obtained from observations of density currents on Shaver Lake.

"A brief talk was given to the Southern California Soaring Association in Los Angeles on July 15. Colored motion pictures were used to illustrate weather phenomena and the possibilities of using liquid density currents to study atmospheric phenomena was illustrated and emphasized. This talk was attended by Captain Hales of the Long Range Weather Research group at the California Institute of Technology, who expressed considerable interest in this method of studying meteorological problems.

"Plans are being considered for making a study of bank revetment methods with a view to recommending types of construction for field use."

#### Drainage Studies

Everglades Experiment Station at Belle Glade, Fla. - C. Kay Davis reports: "The reconnaissance soil survey has been completed and the report is now being prepared. Mr. Hearn has indicated that he will visit this area about the 20th of August to make a final inspection."

Purdue Muck Crops Farm, North Liberty, Indiana - R. E. Morris reports: "During the month the spoil banks were worked down and the weeds cut along the ditch banks and alleys. In an effort to eliminate loss of water in one of the 30" plots an entirely new type of structure was installed. It is in effect a tube and riser earth dam which serves as both a control structure and ditch crossing. Lumber was used for the tube, riser, and retaining walls. All of the control structures have continued to give more or less trouble, and it has been necessary to spend quite a lot of time filling in around them in order to hold the water up. The water in the 15" and 30" plots has been kept at the desired level in the ditches, but due to lack of rainfall the water table in the centers of these plots is below that required. At present, the ditch water level is being held approximately one foot above the elevation called for in the experiment in an effort to get more water into the centers."

Drainage Investigations at St. Paul, Minn. - D. G. Miller reports "My time for this period has been spent on the "Durability of Drain Tile in Peat Soils" report which is now very nearly as completed as possible except for inclusion of the data to be added after we collect and test the field specimens that will be brought in during the next two months."

The Everglades Project at Ft. Lauderdale, Fla. - C. Kay Davis reports: "Our field work in connection with the topographic survey of the Everglades region was slowed down somewhat during the latter part of the month because of the rains which did not come in June but are making up for lost time now. We are cleaning up loose ends here and there, and will in August start a field party in the area north of the Palm Beach Canal.

"In accordance with the suggestion made by Mr. Clayton, excess waters from Section 4 will not be pumped into Section 9 during this calendar year. With the summer rains now in progress we may be able to collect data on the water table in an enclosed area as compared with the water table on adjacent areas of free water movement. This work is being done under the project entitled 'Storage of Excess Waters from Cultivated Areas on Undeveloped Land.'

"Records from the six aerial gages are being recorded semi-monthly in accordance with the procedure outlined for the study of water table conditions in remote areas of the Everglades."

## IRRIGATION DIVISION

### Control of Silting in Irrigation and Drainage Systems

Average yearly silt load of Texas streams - Dean W. Bloodgood, Austin, Texas, reports: "The average yearly silt load as determined at the active silt stations for the Brazos River watershed varies from 32,233 acre-feet at South Bend (drainage area, 12,360 sq. mi.) and in northern portion of State to 24,604 acre-feet at Richmond-Rosenberg (drainage area 24,810 sq. mi.) and in southern part of State. Practically all of the silt load at South Bend is retained at Possum Kingdom dam as only 261 acre-feet passes the dam - either over the spillway or through the outlet gates. During the past 19 years 475,012 acre-feet of silt load have passed the Richmond station on the Brazos River.

"The average yearly silt load as determined at the San Saba station on the Colorado River is 3,667 acre-feet. The drainage area above the station is 18,800 square miles. This station is above a series of four dams that have been constructed during the past six or seven years, having a combined capacity of about 2,941,000 acre-feet. The yearly silt load below Austin dam and since its more recent construction in 1940 is 458 acre-feet. The amount of silt passing Inks dam is 61 acre-feet so most of the silt load passing the San Saba station is retained at the Buchanan and Inks dams. During the past 13 years 47,869 acre-feet of silt load have passed the San Saba station.

"The average yearly silt load at the Three Rivers station on the Nueces River is 537 acre-feet (drainage area above station is 15,600 square miles). The average amount passing Corpus Christi dam for 1.6 years is 233 acre-feet (over spillway and through outlet gates). The drainage area above dam is 16,660 square miles or 1,060 square miles between Three Rivers and the dam. About 40 percent of the amount of silt determined at the Three Rivers station probably passes the Corpus Christi dam. The total amount of silt load passing the Three Rivers station during the past 16 years is 8,591 acre-feet.

"During the past 13.5 years the silt load of the Rio Grande at the Roma station amounted to 175,660 acre-feet, while the silt load for 8.4 years at the Eagle Pass station was 87,121 acre-feet. Most of the silt of the Rio Grande in Texas is contributed by the tributaries in Mexico. The Elephant Butte dam in New Mexico retards practically all of the silt load of the Rio Grande for 24,717 square miles of drainage area, while the net total drainage area above Roma is 157,204 square miles, of which 87,603 square miles are in the United States and 69,601 square miles are in Mexico."

### Rehabilitation of Irrigation and Drainage Enterprises

San Joaquin Valley, Calif. - Paul A. Ewing, Berkeley, Calif., reports concerning this cooperative study with the Bureau of Agricultural Economics: "Studies aimed at the original objective of this detail have resulted in decision on irrigation water requirement units for the principal irrigated crops in San Joaquin Valley, divided into four areas according to varying climatic, soil and ground-water conditions. These units



are being used as bases for calculating total irrigation water needs of the lands now irrigated and those prospectively to come under irrigation. A report of the study has been written. The detail has been expanded to include studies of drainage, cost of water, and zones of depleted water supplies, and will probably extend through August."

#### Customs, Regulations and Laws Affecting Farm Irrigation and Drainage

Hawaii Water Law Report - Wells A. Hutchins, Berkeley, Calif., reports: "The major part of the month was spent on the final draft of this lengthy report, based on a study made in the islands some time ago of the legal and economic aspects of the Hawaiian system of water rights, under a cooperative arrangement with the Honolulu Board of Water Supply. Advance copies of various chapters of the report had been placed in the hands of the Board of Water Supply in order to obtain critical reviews by local lawyers, engineers, and geologists. All comments that will be available have now been received."

#### Lining of Irrigation Canals and Ditches

O. W. Israelsen, Logan, Utah, reports: "Permeability of the clay lining in the Delta-Melville Companies' C-Canal near Delta was measured. A variable-head permeameter of 12-inch diameter and base length of 30 inches was used. It was found that the average permeability at three points was substantially the same as in April, 1941, immediately after the canal was lined and before water was turned in. \* \* \* Inspection of the Melville Company East Canal experimental section, which was lined with clay but not covered with gravel, showed that the lining was not as stable as that of the C-Canal. Both erosion and seepage were more evident. \* \* \* Publication of Utah Experiment Station Bulletin No. 313, entitled 'Canal Lining Experiments in the Delta Area, Utah' has been completed, and the bulletin will be distributed early during August."

#### Utah Irrigation-Company Water Supply, Storage, and Conveyance Facilities

O. W. Israelsen reports: "Utah Experiment Station project No. 221, entitled 'A Survey of Utah Irrigation-Company Water Supply, Storage, and Conveyance Facilities,' has been approved in Washington. Accompanied by G. P. South, we initiated field work on this project, (which is in cooperation with the Division), in Millard, Juab, Utah, and Salt Lake Counties, during late July. Data were obtained for several Millard County companies from the irrigation company officials. The Salt Lake County data were obtained largely from the State Engineer's Office."

#### Pumping for Irrigation

Carl Rohwer, Fort Collins, Colorado, reports: "Work was started at the Bellvue laboratory. Because of deterioration of the concrete channel and metal tanks, considerable work was required to repair the damage. Equipment for making observations on the loss of head through a 12-inch check valve has arrived and is being installed. Observations on the 6, 8, and 10-inch check valves were completed last summer. The tests on the 12-inch valve will complete the series."

## Drainage of Irrigated Land

Imperial Valley, Calif. - William W. Fox, El Centro, Calif., reports: "The Meloland drainage sump has been cleaned and a filter of sized sand repacked into the bottom and into a cavity pumped out below the casing. Better access to water is attested by an increase in discharge. \* \* \* Another model sump study has shown that aquifer material in the finer-textured range will pass through a 20-30 mesh sand filter, although material in the coarser range will not. \* \* \* About 100 additional piezometers were installed on three projects where water-table observations are to be made. \* \* \* Assembling data for a progress report was started and the staff moved to the Los Angeles office to write it."

## Storage of Water Underground for Irrigation

San Joaquin Valley, Calif. - Dean C. Muckel, Pomona, Calif., reports: "Twenty-eight percolation ponds were operated during the month and preparations were made to put another group of 16 ponds into operation. Computation and plotting of percolation rates on all ponds indicated a wide range of rates on different ponds located in different areas but the general trend of all rates has been to decrease with the continued application of water. One of the most striking decreases occurred on a pond in Tulare County where the initial rate was about 7.50 feet a day and in one month had dropped to 0.05 foot a day. This low rate was called to the attention of the agency operating the pond and suggestions made for turning off the water to learn if the high initial rate could again be obtained after drying the soil for a short period. The principal purpose of the ponds is to determine if possible, some way of maintaining a higher average rate than is normally obtained. It appears that several of the ponds have become stabilized and are now ready for experimentation. \* \* \* Assistance was given to representatives of the U. S. Salinity Laboratory in taking cores of soil near several ponds. These cores were taken in transparent lucite cylinders 4 1/2 inches in diameter and 16 inches long with special equipment to jack the cylinders into the soil. Permeability tests are being run in the laboratory."

Arthur M. Young, Pomona, Calif., reports: "Results of studies of permeability of core samples, at the Regional Salinity Laboratory at Riverside, taken from the San Joaquin Valley, show a continuing decrease in the rate of flow through the soil until it becomes nearly stabilized at a fraction of its initial rate. The amount of water that can pass through the soil usually is governed by the infiltration rate at the surface although infrequently a layer of relatively impermeable material at a lower level is the controlling factor. Air entrapped in the soil likewise impedes the flow until it ceases to be a problem by working to the surface or being absorbed by the water. \* \* \* New transparent cylinders 4 1/2 inches in diameter by 16 inches long permit observation of the soil in cores obtained, and abandonment of those with surface imperfections. The smooth interior of the lucite cylinder permits close contact of soil to cylinder, preventing the necessity of artificial filling of a possible annular space surrounding the soil column. A new driving apparatus has been developed for forcing the cylinder into the soil. Pressure is applied through an air pump."



Antelope Valley, Calif. - Dean C. Muckel reports: "Possibility of spreading waste water from the City of Los Angeles Owens River aqueduct near Cottonwood Creek crossing, and storm water from Rock Creek and Kings Canyon, was discussed with representatives of the Operations Division in Antelope Valley. A preliminary study of Rock Creek stream flow records was made to determine the annual amount of water which might be conserved by the installation of a spreading system.

Evaporation, Transpiration and Seepage Losses Affecting Irrigation Practices

Santa Ana Canyon Water-Supply Study - (Orange and Riverside Counties, Calif.) - Dean C. Muckel reports: "Mapping of irrigated lands and water-using native vegetated areas was started during the month. These areas are being outlined and classified according to water use, on recent aerial photographs. These will later be transferred to a base map and the pictured areas converted to acreages. Several conferences, with representatives of the U. S. Geological Survey, which is cooperating in the study, and also with a representative of the Orange County Water District, which requested the investigation, were held."

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Harry F. Blaney, Los Angeles, Calif., reports: "At a conference held in Los Angeles with Mr. Harlowe Stafford, District Engineer of the U. S. Geological Survey, and Paul Bailey, Consulting Engineer for the Orange County Water District, relative to the progress of the field work in determining evapo-transpiration and seepage losses in the area between Prado Dam and the Santa Ana Valley Irrigation Company's canal intake, the results of the chemical analyses of well and spring waters in the area were discussed. These analyses indicate that water obtained from deeper strata from pumped wells is not the same as the water flowing in the Santa Ana River. It was decided that it would be necessary to take additional water samples for chemical analyses before any definite conclusions could be reached. Aerial photographs for the years 1933, 1938 and 1944 have been obtained of the area, so that the changes in vegetative cover and land use can be determined for the past ten years."

Evaporation from water surfaces, Texas - Dean W. Bloodgood, Austin, Texas, reports: "At Buchanan Dam, the evaporation losses for June from a Bureau of Plant Industry pan amounted to 9.85 inches; from a Weather Bureau pan, 8.51 inches; from a Division of Irrigation screened pan, 7.17 inches. \* \* \* The records for June were the first obtained at the Mansfield Dam (Marshall Ford), Texas. The evaporation loss from the Weather Bureau pan was 7.65 inches and from the Division of Irrigation pan, 6.39 inches. \* \* \* During the month, specifications for construction of the three types of evaporation pans we are using at our standard stations were mailed to the Superintendent of the Water Department at Wichita Falls. He plans to have them constructed in the near future, and the new station will be installed at Lake Wichita."



Seepage Studies - Carl Rohwer, Fort Collins, Colorado, reports: "Work was continued on the preparation of the text and drawings for the report on seepage. A compilation of data based on information from the U. S. Census reports showed that the annual loss by evaporation, seepage and leakage from the irrigation canals in the 17 Western States in 1939 was 35,000,000 acre-feet. This does not include the losses from laterals. \* \* \* At the request of the engineers of the local Soil Conservation District, concrete linings installed and being installed on several farms by the SCS were inspected. Pictures were taken showing the linings and the method of doing the work."

#### Snow Surveys and Irrigation Water Supply Forecasts

Western Montana, Western Wyoming, Northern Nevada, Idaho, and Washington - James C. Marr, Boise, Idaho, reports: "In company with Mr. Criddle, I visited and inspected the snow courses on Boise River watershed. An invoice was made of all supplies left in shelter cabins, and the required repairs and replacements to the cabins and cabin facilities were noted. The ski route to Trinity Lake course was marked throughout a 16-mile stretch, where trouble has been experienced by snow surveyors in finding the trail. \* \* \* During the last few days of July, I met Messrs. Work, Parshall and Davis at Moran, Wyoming, to confer on snow-survey procedure and to familiarize Mr. Work with all matters pertaining to snow surveys in Snake River Basin."

Colorado, Western Wyoming, Eastern Montana, South Dakota, Arizona, New Mexico - R. L. Parshall, Fort Collins, Colorado, reports: "I attended a conference at the Shirley Savoy, Denver, covering the reorganization of the Irrigation Division's activities as a more integral part of the Soil Conservation Service. \* \* \* Accompanied by R. A. Work, and E. H. Davis (recently assigned to our Fort Collins office) we made an inspection trip covering a part of the snow-survey area in western Colorado and throughout the southern and central parts of Wyoming. This trip, covering about 2,700 miles, permitted the inspection of more than 40 snow courses and the opportunity to contact a number of our snow-survey cooperating agencies. At Moran a conference was held concerning our snow-survey project, at which were present, R. A. Work, Supervisor of snow surveys; James C. Marr, snow survey leader at Boise; Professor Monson, Agricultural Experiment Station, Bozeman, Montana; E. H. Davis, and myself. A number of important matters were discussed, particularly that having to do with the improvement in form and scope of our monthly forecast reports."

#### Kootenai Investigation, Idaho

Wayne D. Criddle, Boise, Idaho, devoted a week or more to compiling Kootenai evapo-transpiration information preparatory to possibly publishing the data in some form.

#### Irrigation Practices as They Affect Water Supplies

Conference at Yakima, Wash. - Harry F. Blancy attended a conference in June at Yakima, Wash., at which representatives of the Division of Irrigation met with members of the technical staff of the Pacific Coast

Region to discuss problems of irrigated agriculture. Papers presented by members of the Division staff included: "Water Requirements of Crops Affecting Irrigation Planning," "Water Movement in Soil Profile," "Treatment of Alkaline Soils," and "Pertinent Data on Leaching."

Columbia River Basin - Following the Yakima conference, Mr. Blaney inspected the central part of the Columbia Basin Irrigation Project with some members of the Pacific Coast Region's engineering staff. This project contains about one million acres of land. A report on "Irrigation Water Requirements" by the Columbia Basin Joint Investigations was reviewed.

Simi Valley Soil Conservation District, Ventura County, Calif. - At the request of the Portland Regional Office, Harry F. Blaney accompanied the zone technicians and other members of the Soil Conservation Service staff on a trip over the Simi Valley Soil Conservation District for the purpose of inspecting present irrigation practices and to determine what means might be undertaken to conserve the limited water supply in the area by more efficient irrigation methods.

#### Water Conservation and Irrigation Conference

Harry F. Blaney reports: "From July 6 to July 10, at the request of the Washington office, I attended a conference at Denver, Colo., of representatives from Washington, D. C., and field men of the Division of Irrigation and the Water Conservation Division, to consider irrigation, drainage and other water problems and a future program for the Soil Conservation Service on water utilization and drainage, as outlined in General Departmental Circular No. 39. Reports from the following appointed committees were discussed: (1) Service planning assistance and guidance in the field of water conservation use; (2) Working relations between the Division of Irrigation (Research) and Water Conservation Division (Operations) in conformity with General Departmental Circular No. 39; (3) Functional responsibilities of the Regional Water Conservation Division; and (4) Assembling information on water projects for the War Food Administration. As Chairman of the latter committee, I assisted in the preparation of a report and in outlining a procedure for assembling necessary information for use by the War Food Administration in developing recommendations to the War Production Board on irrigation, drainage and flood control projects which require critical materials and manpower. In a memorandum to Dr. H. H. Bennett, Chief of the Service, the War Food Administration requested that qualified men of the Soil Conservation Service be designated to make periodic on-site inspections of important water projects and to submit monthly reports. Men from the Division of Irrigation and the Water Conservation Division staffs were assigned to make such reports on some 28 projects throughout the Western States.

"A procedure was also outlined for examining and reporting on new projects when submitted to the Soil Conservation Service by the War Food Administration. The first new project - the installation of steel drum gates to complete Friant Dam, Central Valley Project, California, was assigned to me, and work was started on assembling the information and preparing a report on the amount of food that might be produced in 1945 and 1946, if the proposed work was done."